
Editorial

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Biographical notes: D.P. Kothari is Director-in-Charge at IIT – Delhi and Professor, Center for Energy Studies, Indian Institute of Technology, Delhi. He has been Head of Center for Energy Studies (1995–1997) and Principal (1997–1998) of Visvesvaraya Regional Engineering College, Nagpur. Earlier (1982–1983 and 1989), he was a Visiting Fellow at RMIT, Melbourne, Australia. He obtained his BE, ME and PhD degrees from BITS, Pilani. A fellow of the Institution of Engineers (India), he has published/presented 500 papers in national and international journals/conferences. He has authored/co-authored more than 18 books, including power system engineering, modern power system analysis, electric machine, power system transients and theory and problems of electrical machines. His research interests include power system control, optimisation, reliability and energy conservation.

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1 Introduction

This special issue on the general area of power quality issues in distribution network was conceptualised to present different views on the entire breadth of the subject. Power quality or rather lack of it in the distribution network has become an area of keen interest due to its potentially disruptive impact on economy. Interest in this subject has led to the development and enforcement of numerous standards, which contain this problem. These standards are evaluated and discussed in Section 1 and a case study is presented in Section 2. In Section 3, various means for power quality assessment and characterisation are discussed and standard software solutions in this area are evaluated. Finally, Section 4 presents a variety of technological solutions stemming from power

electronics technology for containing the problem of harmonics in the distribution network. These solutions include active and hybrid filters, static compensators technologies mainly used in large installations and front-end power factor correction converters as well as multipulse converters used in power supplies and electric drives.

2 Scanning the issue

Section 1 Overview of power quality, standards

Power quality issues and power electronics, A. Pandey, D.P. Kothari and S.S. Bhat.

Required changes in emission standards for high-frequency noise in power systems, C.M. Lundmark, E.O.A. Larsson and M.H.J. Bollen.

Section 2 Case study

Harmonics impacts evaluation for single-phase traction load, P.E. Sutherland, M. Waclawiak and M.F. McGranaghan.

Section 3 Measurement and assessment

Harmonic assessment of electrical power systems, N.R. Watson.

Characterisation of power quality disturbances based on wavelet transform, El Sayed Mohamed Tag Eldin.

Assessing harmonic current source modelling and power definitions in balanced and unbalanced networks, G. Atkinson-Hope and W.C. Stemmet.

Section 4 Technology solutions

Active filters

Power factor improvement using active filter for unbalanced three-phase non-linear loads, M.V. Aware, A.G. Kothari and S.S. Bhat.

A novel shunt active filter algorithm: simulation and analog circuit-based implementation, M.G. Nair and G. Bhuvaneswari.

Hybrid filter

A new transformerless series hybrid active power filter (TL-SHAPF) topology, N. Raghavan, K. Vasudevan, K. Shanthi Swarup, T. Ellinger and J. Petzoldt.

STATCOM

Modelling of DSTATCOM for distribution system, B. Singh, A. Adya, A.P. Mittal and J.R.P. Gupta.

Power factor corrected power supplies

Analysis and design of single-phase power-factor corrected AC–DC Cuk converter with high-frequency isolation, B. Singh and M. Agrawal.

Electric drives

Active waveshaping of AC mains current in direct torque-controlled permanent magnet synchronous motor drive, B. Singh, B.P. Singh and S. Dwivedi.

A novel harmonic mitigator-based 12-pulse rectification for vector controlled induction motor drives, B. Singh, G. Bhuvaneswari and V. Garg.

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We are grateful to all the authors for contributing such precious and informative articles for this special issue of IJETP. Thanks are also due to reviewers who have spared their valuable time in reviewing different articles and thus enhancing their quality. We firmly believe that this special issue will provide professionally relevant information and guidelines to all the stakeholders in the field of Power Quality.

We are extremely grateful to members of editorial team headed by Dr. M.A. Dorgham and Mrs. Janet Marr for their immense contribution in the preparation of this special issue. We acknowledge our deep appreciation for their effort but for which this special issue would not have acquired its present shape. Last but not the least, we would like to place on record our sincere thanks and appreciation of immense and untiring efforts put in by our students and staff in every stage of this project.